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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,591	09/13/2006	Dong-seok Kim	29137.096.00	1374

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EXAMINER	
LISTVOYB, GREGORY	
ART UNIT	PAPER NUMBER
1796	

MAIL DATE	DELIVERY MODE
11/20/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,591	KIM ET AL.	
	Examiner	Art Unit	
	GREGORY LISTVOYB	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-17* is/are pending in the application.

4a) Of the above claim(s) *4-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

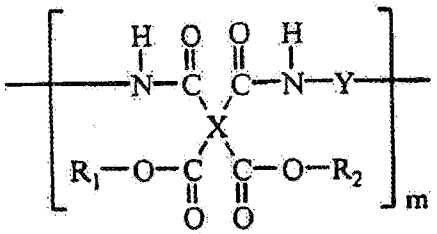
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Jung et al (US 2002/0093077) herein Jung in view of Okada et al (US 2002/0055610) herein Okada and evidenced by Hosaka et al (US 2004/0048004) herein Hosaka and further in view of Maeda et al (US 6664021) herein Maeda or Machida et al (US 6159654) herein Machida (necessitated by Amendment).

Jung discloses a reactive transparent polyimide precursor having the structure of the following Formula (1) (see Claim 1):



Formula (1)

Where

R1 and R2 are independently a Hydrogen atom, or an acid-

dissociable group, which may contain an unsaturated Hydrocarbon C 1-20 (see Claim 6).

X is a tetravalent, an aromatic or an aliphatic organic group; Y is a divalent, an aromatic or an aliphatic organic group; and m is an integer equal to or greater than 1.

Jung discloses that the ratio between Hydrogen atom and acid-dissociable group is within the broad range of 0.1-1 (see Claim 7), which gives the acid value of the precursor within the range of 30 to 200 mg KOH/g.

Note that claim 1 of Application examined claims R1 and R2 (which correspond with R1 and R2 of Jung) are independently each other hydrogen atom, or organic groups ...provided that they are not hydrogen atoms at the same time.

Therefore, acidic group constitutes 0.5-1 ratio to Hydrogen. In other words the minimum ratio of substituted groups to Hydrogen is 0.5.

Thus, the above amount is within the ratio disclosed by Jung.

Jung does not teach that "X" is alicyclic tetracarboxylic acid and molecular weight of his polyimide precursor and that fragment Y has an ethylenically unsaturated bonds.

Okada discloses a reactive transparent polyimide precursor and polyimide comprising a reaction product of alicyclic tetracarboxylic acid dianhydride (1,2,3,4 cyclobutanetetracarboxylic acid dianhydride, (see line 0139)- the same compound used

in the Application) and diamine, having ethylenically unsaturated side chain (the same diamines used in the application, see line 0150).

Okada clearly teaches that the above diamines have photosensitive groups, which means that they can be successfully used in photosensitive polyimides.

Since Jung discloses such a composition, diamine, containing ethylenically unsaturated groups increases polyimide response to radiation, which makes the following cross-linking more efficient.

Therefore, it would have been obvious to a person of ordinary skills in the art to use diamine having ethylenically unsaturated side chains for production of a photosensitive polyimide precursor, since their presence increase polyimide response to radiation, which makes the following cross-linking more efficient.

As evidenced by Hosaka, alicyclic tetracarboxylic acid is preferred in optical applications due to its excellent transparency (see line 0043).

Therefore, it would have been obvious to a person of ordinary skills in the art at the time the invention was made to use alicyclic tetracarboxylic acid component in Jung's polyimide precursor to obtain film with excellent transparency

In reference to Claim 3, Okada teaches that Molecular Weight of the polyamide precursor is within the range of 5000-1000000 (see line 0136).

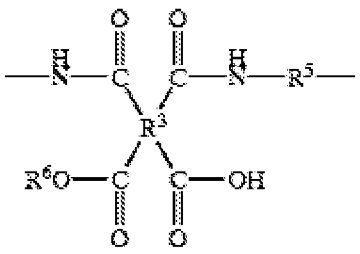
If the average molecular weight is less than 5,000, the resulting soluble polyimide will have a smaller molecular weight. Accordingly, the photosensitive resin composition including such soluble polyimide, if used as it is, is not practical because of its brittleness. Conversely, if the polyamic acid has an average molecular weight of greater than 1,000,000, a varnish of the polyamic acid will have an excessively high viscosity, so that the handling thereof will be difficult. (see line 0108).

Therefore, it would have been obvious to a person of ordinary skills in the art at the time the invention was made to prepare polyimide precursor with molecular weight within the range of 5000-1000000.

Regarding new limitation of claim 1, Jung does not teach his polyimide being negative polyimide precursor.

Machida and Maeda teach negative polyimide precursor.

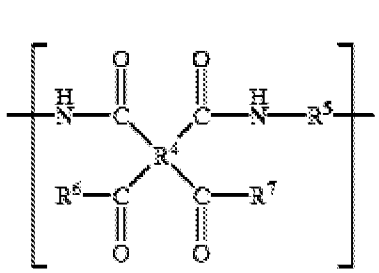
Maeda teaches negative polyimide precursor composition (see Abstract, Column 1, line e15, having a following formula:



(8)

where R3 is alicyclic group and R6 is C1-C7 alkyl.

Machida teaches negative photosensitive polymer composition (see Abstract), comprising the following structure (see Column 12, line 55) :



(7)

wherein R^4 is a quadrivalent organic group; R^5 is a bivalent organic group; R^6 and R^7 may be the same or different and are individually a monovalent organic group or hydroxyl group with a proviso that at least one of R^6 and R^7 is an organic group having a hydroxyl group bonded directly to an aromatic ring.

Maeda teaches that his negative type photosensitive resin composition having excellent sensitivity and resolving properties which can inhibit volume shrinkage at the time of curing, can suitably adhere to a substrate, and can form a polyimide coating film pattern having good heat resistance on the substrate by baking (see Column 1, line 10).

Note that Jung polyimide is analogous to one disclosed by Maeda and Machida. Therefore, Jung's polyimide possesses properties analogous to ones of Maeda.

Thus, it would have been obvious to a person of ordinary skills in the art to apply Jung's polyimide, modified with Okada, Machida or Maeda as a negative type

precursor, since it possesses excellent sensitivity and resolving properties which can inhibit volume shrinkage at the time of curing, can suitably adhere to a substrate, and can form a polyimide coating film pattern having good heat resistance on the substrate by baking.

Response to Arguments

Applicant's arguments filed 8/25/2009 have been fully considered but they are not persuasive.

Applicant argues that “Negative type precursor is different from positive type precursor in operation mechanism. Although Maeda or Machida discloses analogous polyimides, these polyimides are completely different and cannot be interconverted. In other words, if one negative type precursor and one positive type precursor are presented by analogous formulae, they still cannot be interconverted because of the different operation mechanism by light”.

Examiner does not understand the concept that “Although Maeda or Machida discloses analogous polyimides, these polyimides are completely different”. Maeda and Machida clearly disclose negative type precursor polyimide, which have the same structural elements as a polyimide of the primary reference (Jung). Thus, all the limitations of claim 1 are met.

Applicant argues that Maeda and Machida's polyimide are different from one of the claim1.

However, primary reference (Jung) modified with Okada discloses the same structure as one of the Application. Maeda and Machida are secondary references, which used to illustrate that polyimide with the structure, analogous to one of Jung can be used as a negative type precursor. (Note that Applicant admits on the record (see Remarks filed on 8/25/2009) that Maeda and Machida disclose polyimide precursors analogous to a primary reference).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/
Supervisory Patent Examiner, Art Unit 1796
GL